(12) UK Patent Application (19) GB (11) 2 316 357 (13) A

(43) Date of A Publication 25.02.1998

(21) Application No 9716137.6

(22) Date of Filing 31.07.1997

(30) Priority Data
(31) 9617040 (32) 14.08.1996 (33) GB

(71) Applicant(s)
BLP Group Plc

(Incorporated in the United Kingdom)

Sandallstones Road, Kirk Sandall, DONCASTER, DN3 1QR, United Kingdom

(72) Inventor(s)
Peter Arthur Clarke

(74) Agent and/or Address for Service
Wynne-Jones, Lainé & James
22 Rodney Road, CHELTENHAM, Gloucestershire, GL50 1JJ, United Kingdom

(51) INT CL^6
B32B 21/10

(52) UK CL (Edition P)
B5N N175 N176 N177 N178 N18X N180 N188 N19Y N195 N196 N199 N20Y N207 N21X N21Y N2108 N211 N2110 N2114 N223 N224 N226 N248 N255 N256 N257 N258 N26Y N263 N271 N278 N295 N297 N32Y N389 N401 N402 N403 N417 N418 N42X N42Y N426 N427 N46X N500 N518 N58X N58Y N593 N595 N597 N603 N615 N639 N648 N650 N658 N659 N661 N680 N735 N741 N747 N75Y N76X N763 N771
U1S S1714

(56) Documents Cited
EP 0453025 A1 DE 003829170 A1 DE 002722076 A1
US 4942084 A US 4430371 A
Abstracts of JP080142268A(Hokusan)

(58) Field of Search
UK CL (Edition O) B5N
INT CL^6 B32B 21/08 21/10 21/14
ONLINE: WPI,CLAIMS

(54) **Water-resistant wood veneer laminates**

(57) A flexible, water-resistant laminated (28) is produced by bonding a wood veneer (12) by means of a waterproof or water-resistant adhesive to a web (10) made wholly or principally of waterproof or water-resistant fibres.

The web is preferably a non-woven generally discontinuous web (e.g. spun laid) which allows the adhesive readily to permeate the web during formation of the laminate, and which is strong, flexible and water-resistant to withstand the forces sustained during sanding and wrapping.

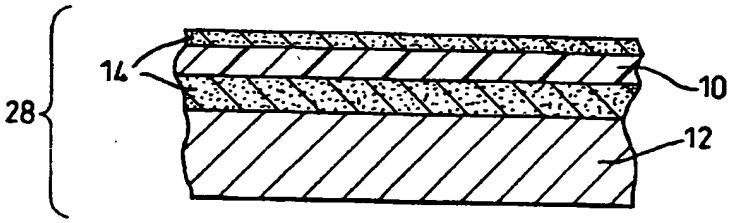

Fig. 1

GB 2 316 357 A

At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

This print takes account of replacement documents submitted after the date of filing to enable the application to comply with the formal requirements of the Patents Rules 1995

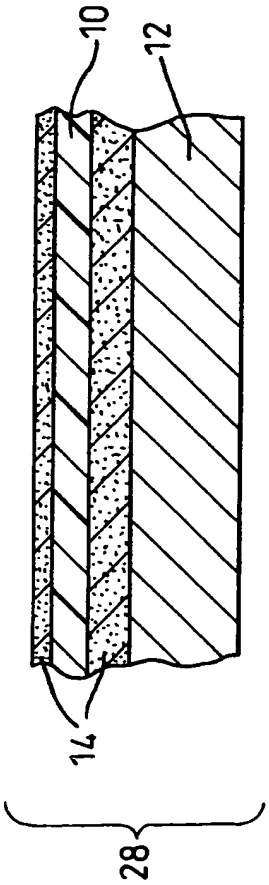

Fig. 1

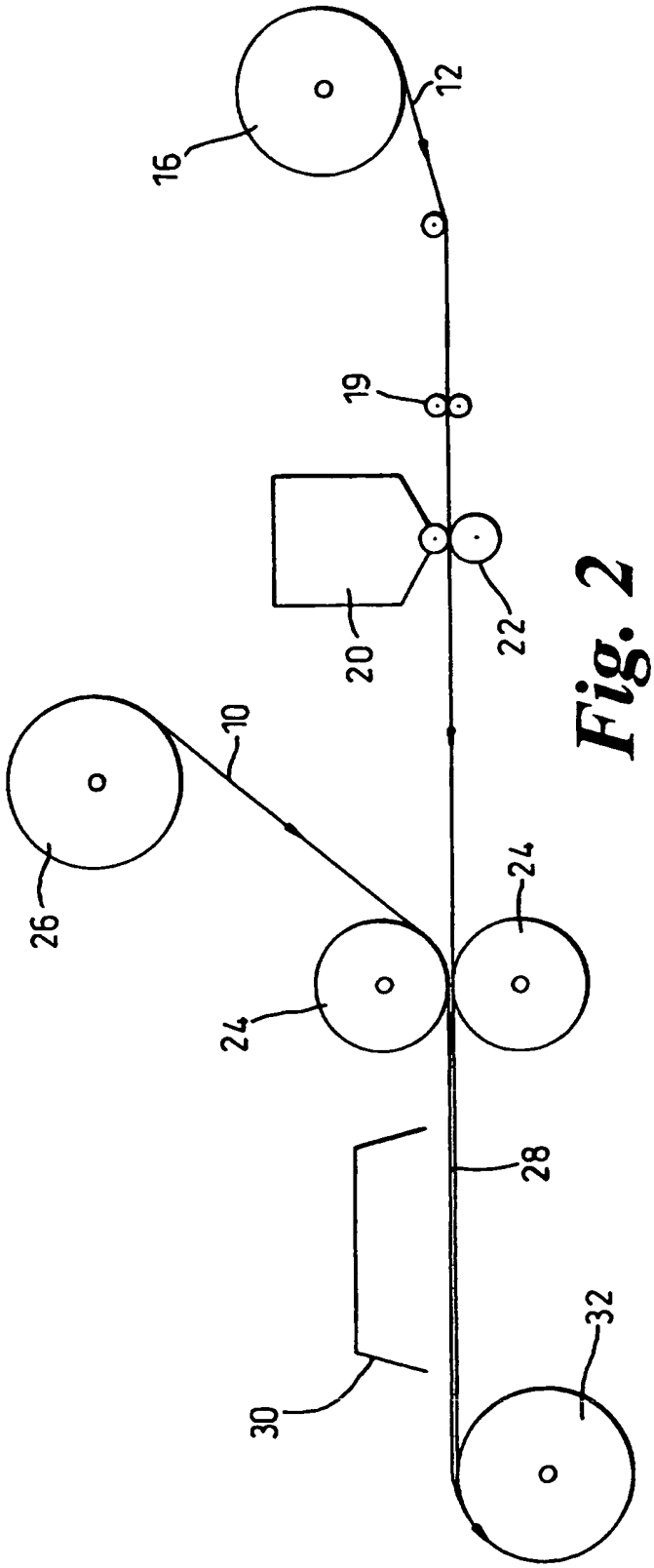

Fig. 2

Water Resistant Wood Veneer Laminates

This invention relates to wood veneer laminates and in particular, but not exclusively, to water-resistant flexible real wood veneer laminates for profile wrapping. The invention also extends to methods for producing a wood veneer laminate, methods for applying a wood veneer to a profile or substrate, to profiles or substrates to which said laminate has been applied, and to articles or structures incorporating said profiles or substrates.

Real wood veneers have been used for many years to be wrapped around various substrates or profiles to produce wrapped mouldings for the furniture and architectural industries. These mouldings can have sections of intricate shape for moulded cornices, pelmets, architraves, window frame components etc, and so the laminate must be sufficiently flexible to follow closely abrupt changes in section, small radii of curvature etc, without cracking or leaving substantial voids. The wrapping process requires that the veneer is sanded to a very thin depth so as to achieve the necessary level of flexibility and this can only be achieved if the veneer is first reinforced by a suitable backing material.

Traditionally, profile wrapping veneers have been made using a continuous sheet or layer of a non-woven 70% cellulose/ 30% long fibre polyester/binder impregnated with a Polyvinyl acetate (PVAc) adhesive which is then laminated to rolls of veneer using a PVAc or other thermoplastic

adhesive. Increased water-resistance is achieved by utilising cross linked adhesives for impregnation and/or lamination but this is inevitably at the expense of reduced flexibility. These traditional techniques are not capable of producing a sufficiently water resistant and flexible veneer continuous roll or strip product suitable for applications where high levels of water might be encountered, such as window frames. Also the production of this conventional material requires impregnation of the backing material prior to laminating to the wood veneer.

This has greatly limited the effective utilisation of real wood veneer in a large market sector despite the enormous aesthetic qualities of genuine wood veneer. We have developed a wood veneer/backing material laminate which overcomes at least some of the above difficulties and which provides an effective method of producing exceptional water resistance whilst maintaining a high degree of flexibility in continuous real wood veneer rolls or veneer strips suitable for wrapping products such as window frames.

Accordingly, in one aspect, this invention provides a laminate comprising a wood veneer bonded by means of a generally flexible waterproof or water-resistant adhesive to a flexible web consisting wholly or principally of waterproof or water-resistant fibres.

The flexible web preferably consists wholly of synthetic fibres, such as polyester, rayon (regenerated cellulose), nylon (polyamide), or mixtures thereof. A particularly preferred web is made of a bi-component

filament comprising a core polyester fibre and a nylon skin.

The web may be non-woven or woven. Preferably, said web is generally discontinuous with gaps between adjacent fibres, rather than being in a continuous sheet form. In this way, the web can provide sufficient support and reinforcement to the wood veneer during subsequent sanding and wrapping processes, whilst providing a finished laminate which is relatively flexible and which has a greatly reduced tendency for cracking. In addition, the open texture of such a web allows adhesive to permeate the web and surround the fibres thereof when the veneer and web are bonded. In a particularly preferred embodiment, the web comprises a thermally bonded spun laid fibre.

Unlike in the conventional materials, the flexible web is preferably applied to the wood veneer without any pre-impregnation of the web, thereby removing a process step. However, we do not exclude the possibility of a pre-impregnation step.

The waterproof or water-resistant adhesive is preferably selected from polyurethane-based, polystyrene-based, polyvinyl acetate-based, rubber-based adhesives, or mixtures thereof. A particularly preferred adhesive is a polyurethane-based adhesive as this gives a good combination of flexibility and water-resistance. However, the choice of adhesive may be varied in accordance with the desired properties of the finished laminate, and for compatibility with the adhesive used for bonding the laminate to the profile or substrate.

Preferably, the thickness of the laminate prior to application to a substrate lies in the range of from 0.25mm to 0.70mm, and more preferably in the range of 0.25mm to 0.35mm. These thicknesses will of course be set very much by the particular application for which the laminate is intended, the nature of the real wood veneer and the amount of sanding applied. Thus for wrapping a profile with sharp curves a thickness of between 0.25mm and 0.35m would be preferred, but for softer curves a thickness in the range of from 0.35mm to 0.45mm and for a flat surface 0.45mm upwards would be suitable in most cases.

According to another aspect of this invention, there is provided a method for producing a laminate which comprises bonding a generally flexible web of waterproof or water-resistant fibres to a wood veneer by means of a waterproof or water-resistant adhesive.

According to another aspect of this invention, there is provided a laminate comprising a wood veneer backed by a non-woven, generally discontinuous web consisting wholly or principally of waterproof or water-resistant fibres.

According to a further aspect of this invention, there is provided a method of applying a wood veneer to a profile or substrate, which comprises applying to said profile or substrate a laminate of the general form as defined above, and bonding said laminate to said profile or substrate.

The invention also extends to a profile or substrate with a wood veneer applied as described above, as well as to articles or structures incorporating a profile or substrate

wrapped with a wood veneer as described above.

Whilst the invention has been described above, it extends to any inventive combination or sub-combination of the features set out above or in the following description.

The invention will now be described by reference to the following non-limiting example, reference being made to the accompanying drawings, in which:

Figure 1 is a schematic section view through a wood veneer laminate in accordance with this invention, and

Figure 2 is a schematic diagram of apparatus for producing a wood veneer laminate in accordance with this invention.

Example

A spun-laid web of bi-component filament (10) (AKZO Nobel - Colback® W30) comprising core polyester and skin polyamide 6 (nylon) was laminated to a continuous roll of white oak veneer (12) 180mm wide using a polyurethane-based hot melt adhesive (14)(Rakoll®PU 48/S from H.B. Fuller GmbH (previously identified as PU1/105b)) in accordance with the manufacturer's directions. Figure 1 is a schematic section view of the laminate so formed. The Colback® W30 is a spun laid non-woven thermally bonded material. It provides a generally uniform open structure; a high tensile strength per unit weight; isotopic characteristics; dimensional and thermal stability; no chemical binder, and a high affinity for coating compounds. The particular product used in the example had the following properties:

Mass/unit area	30 g/m^2

Thickness	0.2μm
Breaking Strength	55 N/5cm

In this example, the adhesive is a moisture curing reactive polyurethane hot melt. It is solid when cold and consists of EVA (ethylene vinyl acetate) adhesive, a prepolymer and isocynanate radicals. When the adhesive is heated, the EVA melts and forms an initial bond. The curing reaction of the polyurethane is also started and cross-linking continues by using moisture from the atmosphere.

Referring to Figure 2, the veneer 12 is fed off a veneer off-wind 16 over a feed roller and a tracking device 19 to a conventional wide hot melt applicator 20 which includes a pressure roller 22 and applies a thin continuous layer of adhesive at a temperature typically in the range 100-140°C to the rear surface of the veneer. Whilst the adhesive is still wet or tacky the veneer passes between a pair of chilled pressure rolls 24 together with the spun laid web 10 which is fed from a non-woven off-wind 26, to cause the web 10 to be firmly pressed down into the layer of wet or tacky adhesive and to firmly bond thereto. The laminate 28 so formed then passes through a forced air cooling zone 30 to ensure that the adhesive is non-tacky before the laminate is wound onto a drum at a rewind station 32.

The resulting laminate is water-resistant such that the bond between the veneer and backing material remained satisfactory even after the product was immersed in a bucket or water for two weeks.

The product is then sanded to a thickness selected to provide the required flexibility, having regard to the curvature to which the veneer will be subjected in use. Following sanding, using the same polyurethane adhesive as for veneer lamination (Rakoll®PU 48/S), the laminate was easily wrapped around a window frame component comprising a primed unplasticised polyvinyl chloride (UPVC) as a core material. This lamination was carried out on a standard Barberan profile laminating machine using processing parameters well known to those skilled in the art, and the resulting window frame was both aesthetically satisfactory - without any cracking of the veneer - and highly water resistant.

It should be appreciated that any species of real wood veneer may be used in either continuous rolls or veneer strips, and any width of veneer is treatable subject only to the limitations of the machinery required.

The wrapping process may be applied to a wide variety of core materials such as medium density fibre board (MDF), chipboard solid or laminated wood,, unplasticised polyvinyl chloride (UPVC), aluminium, other plastics extrusions etc.

Likewise, the invention is not limited to any particular form of profile laminating machine, as any machine which has the facility to use the suitable adhesive can be employed, e.g. Fritz, Berg, Duspohl or other machines operating on similar principles, in addition to the Barberan machine used in the example.

It should be noted that the invention may be performed

using many other different types of adhesives to provide a laminate which is sufficiently robust to withstand sanding to a required thickness if required and capable of flexing as necessary to follow a particular profile without cracking. Thus other polyurethane-based systems may be used such as water or solvent based systems. In a solvent-based system one part of the adhesive system (containing hydroxyl groups) is carried in a solvent (typically methylene chloride) to which is added a catalyst (containing free isocynanate radicals). As soon as the catalyst is added, the mixture starts to cross-link but the solvent allows it to remain liquid long enough to enable application to whatever medium is required. The solvent is then evaporated (normally in a heat tunnel) to increase the viscosity of the mixture to give it an initial "tack" to form the initial adhesive bond when applied to a substrate. Subsequent adhesive bond strength is increased as the chemical cross-linking takes place in the laid film. Water based systems work in a similar way with water as the solvent, but the water takes longer to evaporate. Likewise, adhesive systems other than those based on polyurethanes may be used.

Although in the above example a web of synthetic fibres is used, the invention extends also to webs of naturally occurring waterproof or water-resistant fibres which are capable of withstanding prolonged exposure to moisture in use.

CLAIMS

1. A laminate comprising a wood veneer bonded by means of a generally flexible waterproof or water-resistant adhesive to a flexible web consisting wholly or principally of waterproof or water-resistant fibres.

2. A laminate comprising a wood veneer backed by a generally discontinuous web consisting wholly or principally of waterproof or water-resistant fibres.

3. A laminate according to Claim 1 or Claim 2, wherein said web consists wholly or principally of synthetic fibres.

4. A laminate according to any preceding Claim, wherein said web consists of one or more selected from the group of synthetic fibres comprising polyester, rayon, nylon fibres or mixtures thereof.

5. A laminate according to Claim 4, wherein said web fibres consist of a bi-component filament comprising a polyester core and a nylon outer layer.

6. A laminate according to any preceding Claim, wherein said web is non-woven.

7. A laminate according to Claim 1 or any Claim dependent thereon, wherein said web is generally discontinuous, defining gaps between adjacent fibres.

8. A laminate according to any preceding Claim, wherein said web comprises a spun laid fibre.

9. A laminate according to Claim 2 or any Claim dependent thereon, wherein said wood veneer is bonded to

said discontinuous web by means of a generally flexible waterproof or water-resistant adhesive.

10. A laminate according to Claim 1 or 9, wherein said waterproof or water-resistant adhesive is selected from the group comprising polyurethane-based, polystyrene-based, polyvinyl acetate-based, rubber-based adhesives, and mixtures thereof.

11. A laminate according to Claim 10, wherein said adhesive comprises a moisture-curing reactive polyurethane hot melt adhesive.

12. A laminate according to any preceding Claim having a thickness in the range of from 0.25mm to 0.70mm.

13. A laminate according to Claim 12 having a thickness in the range of from 0.25mm to 0.35mm.

14. A method for producing a laminate which comprises bonding a generally flexible web of waterproof or water-resistant fibres to a wood veneer by means of a waterproof or water-resistant adhesive.

15. A method according to Claim 15, comprising sanding said laminate to a required thickness after said bonding.

16. A method for applying a wood profile to a profile or substrate, which comprises bonding to said profile or substrate a laminate according to any of the preceding Claims.

17. A profile or substrate with a wood veneer applied in accordance with Claim 16.

18. An article or structure incorporating a profile or substrate in accordance with Claim 16.

19. A laminate substantially as hereinbefore described with reference to, and as illustrated in, Figure 1 of the accompanying drawings.

20. A method of producing a laminate substantially as hereinbefore described with reference to Figure 2 of the accompanying drawings.

The Patent Office

12

Application No: GB 9716137.6 **Examiner:** R.J.MIRAMS
Claims searched: 1 to 20 **Date of search:** 28 August 1997

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.O): B5N

Int Cl (Ed.6): B32B 21/08, 21/10, 21/14

Other: ONLINE: WPI, CLAIMS

Documents considered to be relevant:

Category	Identity of document and relevant passage		Relevant to claims
X	EP0453025A1	(Stamicarbon) whole document	at least 1, 2, 3, 6, 7, 9 to 11, 14 and 16 to 18
X	US4942084A	(Prince) whole document	at least 1, 3, 4, 10, 14 and 16 to 18
X	US4430371A	(Boyes) whole document	at least 1, 3, 4, 6, 14 to 18
X	DE3829170A1	(Geiger) see abstract	at least 1, 3, 14 and 16 to 18
X	DE2722076A1	(Rudolf Schieber) see abstract	at least 1, 3, 4, 10, 11, 14 and 16 to 18
X	Abstracts of JP080142268A (Hokusan)		at least 1, 14 and 16 to 18

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.